Powerful Glass at the Williams Bay Observatory -Brings the Moon With-in Sixty-four Miles of the tarth-Close bindy of the Planets

For nearly two years the big eye of the Yerkea telescope in the observatory of the University of Chicago, at Wiliof the University of Chicago, at winds the University of Chicago, at winds ams Bay, Wia, has been spying out the secrets of the stare. It has looked ene-fourth further into space than any instrument devised before it. Night after night the huge, grim Cyclopean alowly round in its pondereye swings slowly round in its ponder-ous frame, crouched in its big white dome, and keeps a sleepless watch upon the heavens. The great dome is open to the sky. The ponderous tube awings slowly, imperceptibly, with the turning of the earth from sunset to sunrise again. Shut in the black shaft which supports the barrel of the refractor is a clock, a wonderful piece of mechanm, which tells off the motion of the globe on its axis. The telescop shifts, hair breadth by hair breadth, guided by the clock, and making the circuit of the heavens, with tireless eye fixed all night long upon a single star. There is no escape from the big eye. As the earth swings in one direction, the eye ellently alters its focus, never aweary

through the largest and most perfect telescope in the world? What has the big lens so far revealed to the astronomers who have watched it as an oracle

and which astronomers we too glad to dispusse with

The telescope was next turned upon Jupiter, the largest planet in the solar system, and as big as all of the other planets put together. The distance from this earth to Jupiter is a trifle of 400,000,000 miles, and is takes forty-three minutes for its light to reach the earth.
Jupiter's disk looked about as big as a
large marble, probably two inches in
diameter. At its side, in a nearly
straight line to the right, appeared four
small marbles, its satellites. The color of the planet was almost white, a very light yellow. Across the planet appear-

ed three faint purple streaks, on the order apparently of the man in the moon. While at Lick Observatory Professor Barnard discovered the fifth satellite of Jupiter, but was unable to study it to any advantage. The Yerkes telescope brings out this fifth moon very clearly to the eye of the astronomer, and Prof. Barnard has been able to observe it and measure it with great accuracy.

Star clusters seen through the Yerkes telescope are wonderfully beautiful, a great ball, like a swarm of golden bees. The moon was too full for a good view, and showed merely a pale yellowish surface.

About noon Prof. Hale had the tele scope turned on the sun. No sun spots were visible, so the telescope was di-rected along the disk of the sun at the flames which burst through its dense, gaseous cloud wrappings and thrust their tongues far out into space. On a pink background, shading into dark since the first day it peered into space? red, and fully rounded, one saw a ters to which an object can be magni-

were rewarded with two disks fort two inches in diameter and as near coloriess and flawless as glass we ever made. These blocks of glass were made into the lenses now in the eye of the Yerkes telescope. The glass was ground and finished by the firm of Alvan Clark & Sons, Cambridge-

Just as Americans have never been able to cast perfect and large disks of optical glass, so the French have not been able to pollsh the disks perfectly after they are cast. For four years Mr. Alvan G. Clark worked at the lenaes. It may be that another such perfect glass will never be made. The secret of the pollshing has been handed down for three generations in the Clark family. Previous to the work of the Clarks a German to the work of the Clarks a German family—the Frauenhofers—had polished these glasses. For a century after the death of the last Frauenhofer it seemed that the art of polishing optical glasses was lost. Then Alvan Clark, a portrait painter in Massachusetts, attracted the attention of English scientists, and he and his family far excelled the German artists in glass. Mr. Alvan G. Clark, the last of his family, attended the dedication exercises of the Yerkes glass, returned to his home, and died within a few days.

The eye piece of a telescope, through which the observer looks, is the part of the instrument which magnifies the objects seen. The number of diame

country and of Europe smoked an after-dinner cigar and dis-

Much of the work at the Yerkes obnervatory during the past eighteen months has been of a kind which months has been of a kind which could not be accomplished at any other in the world. In all observations which involve minute measurements of the highest precision the Yerkes telescope is unrivaled. The measurement of the motions of the stars, which approach or recede from the earth, are of great importance, as data gathered from these throw light upon the movements of the entire solar systhe movements of the entire solar system. To this problem, the greatest in astronomy, Dr. Hale, Prof. Frost and Mr. Ferdinand Ellerman have applied

themselves. The sun, with all its attendant planets comprising our solar system, is rushing toward the star Vega, or Al-pha, of the Lyre, at the inconceivable rate of ten miles a second. Vega is one of the most beautiful stars in the heavens and can be seen now near the zenith on any fair evening. Probably since the life of man began, perhaps since the universe was born, our solar system has been speeding toward this star. In the life of a generation the sun comes hundreds of millions of miles nearer its destination. But in many generations, to all appearances, this approach would not be percepti-ble. The journey, so far as mortals are concerned, must be eternal.

When, where and how, if ever, did this journey begin; when, where and how, if ever, will it end? is the greatest of the unsolved problems of astron-

Trees Suggested Skeeters.

'Tis not often one runs across a lo quacious street-car conductor. Usually they are just about as talkative as graven images. But there was a new man on the Indiana avenue line and he was hungry for a talk. Along about Forty-seventh street a man took a standing seat on the back platform and the conductor fastened on him instantly.

"That's a fine grove of trees," he remarked, pointing to a grove of maples. "but whenever I see trees I say to myself 'skeeters.' Yes, sir; that's the very first thing I say to myself-'skeeters.' I hate skeeters. I can't abide em. Consequently I don't like trees. No, sir; I'm a treeless plain man, I am a boundless prairie feller. Why, sir, I had a good job and as nice a little home as you ever see down East an' I wuz fixed for life right there. But it was down in Jersey. An' the skeeters bit me till I didn't know my own name; would have answered to the name of Smith or Jones just as well. Well, sir. throwed up my job an' sold my home and I started for New York. But, Lord love you, sir, I got into trouble quick. They stopped me 'fore I could get into New York. They said I had the smallpox, I was bit up so frightful. But I finally got West, an' here I am. An' whenever I see trees I thinks skeeters. Why, str. down in Jersey many's the time I've seen them skeeters flyin' about smokin' clay pipes; yes, sir. smokin' clay pipes to keep the other skeeters off 'em. Once I---

But here the passenger jumped off

PRESIDENT ZELAYA.

He Is Regarded on One of the Ablest

Statesmen In Central Americ J. Santos Zelaya, the president of the Micaraguan Republic, whose power has been clipped by Gen. Reyes, the rebel, is regarded as one of the ablest statesmen in Central or South America. He is approaching 30 years old, and is a



wealthy coffee planter. From his youth he was interested in politics, and has always been known as a leader of the liberal party. He was educated in Paris, and lived in that city for eight years. During the wars of the Central American states he won the rank of general, and the liberals ran him for and elected him to the presidency. Gen. Reyes declared hims-if the provisional president of Nicaragua, and Honduras gave him sid.

Cororado's Gold Exhibit A solid gold nugget miniature of Pike's Peak, weighing over two tons and worth a million dollars, will be Colorado's gold exhibit at the Paris Exposition. It will reach New York City under guard in a special car, and thence the government will convey it to Paris. The exposition commissioner have guaranteed its safe return. It be purposed to duplicate the mountain it

natural features, so that visitors to its summit will recognize it in the nugget. The signal station on the summit, a squat building only eighteen feet high, but perhaps forty long and fifteen wide, will appear. Climbing up Engleman's Canon will be seen the famous cog road, with perhaps an engine and a coach, the regulation train

on the highest railroad in the world.

researches as to the structure shed some startling facts regarding anges which man is at present uning at a hale and hearty age sear Cald

dergoing physically.

It is believed that man was formerly endowed with more teeth than he possesses now. Abundant evidence exists that, ages and ages ago, human teeth were used as weapons of defense. Un-intentionally traces of such use are often revealed by a sneer. The teeth are sometimes bared, dog-like, ready,

as it were, for action.

The practice of eating our food cooked and the disuse of teeth as weapcooked and the disuse of teeth as weap-ons are said to be responsible for the degeneration that is going on. The wis-dom teeth, in fact, are disappearing. Human jaws, found in reputed Palaeo-litic deposits have wisdom teeth with crowns as large, if not larger, than the remaining molars.

In ancient times a short-sighted sollier or hunter was almost an impossi bility; to-day a whole nation is afflicted with defective vision. It is almost certain that man once possessed a third eye, by means of which he was enabled to see above his head. The haman eyes formerly regarded the world from the two sides of the head. They are even now gradually shifting

to a more forward position.

In the dim past the ear-flap was of great service in ascertaining the direction of sounds, and operated largely in the play of the features. But the muscles of the ear have fallen into disuse, for the fear of surprise by enemies no longer exists.

Again, our sense of smell is markedly inferior to that of savages. That it is still decreasing is evidenced by observatious of the olfactory organ. But the nose still indicates a tendency to become more prominent.

Color Your Own Pictures.

Some of our amateur photographers may be interested in learning an easy way of coloring a photograph nicely without having first taken lessons in drawing or painting. This is the method: After you have printed wour photograph, and before you mount it on cardboard, hold it against the window, placing the picture side toward the glass; then sketch clearly on the back of the picture the outlines of the parts to be colored. When this is completed place the picture side of the photograph against a blotter and apply the desired colors to the back of the picture, keeping within the sketched out lines. Then prepare a mixture consist ing of ten parts benzine and one part vaseline, and pour this over the photo graph, rubbing it thoroughly into the paper with the finger. Do this on the face and back of the picture. After the picture has become transparent through this process let it stand for an hour or two, then dry it with a cloth and mount it on cardboard. The color will show clearly.

Worse than a Dentist. There is in Toledo a young grocery clerk who would like to meet the inventor of the self-colling string-holder. That man is responsible for the gro-

cery clerk's undoing. The clerk got into the habit years ago of biting off the string instead of breaking it, after tying bundles. Naturally his teeth protested against the practice. At length they gave up and

He bought false teeth. Before he fairly got acquainted with them, so to speak, the patent string-holder was established in the store. Then, as fate would have it, a young woman whom be secretly admired came in to buy five pounds of sugar.

With the activity of an anxious lover he made up the package and tied it. Then, according to his old custom, he bent forward and severed the string with his teeth.

But he forgot the bolder, and he did not realize the end of the cord had wedged itself between two of his new teeth-until, as the spring rolled up the slack, his "plate" was hoisted from his mouth and triumphantly waved

aloft at the end of the string. Bad Postures in Sitting. Physicians who teach physical cult ure assert that it is not the ice water we drink, por the soda water, nor the amount of smoking that men folk indulge in, that causes us to be a nation of dyspeptics, but the bad postures that we adopt when sitting. A correct attitude in sitting requires proper beight and width of seat, a deak or table of the proper height when desk work is required, and a proportionate amount of care upon the part of the pupil to sit upon his seat in a proper position. The relation of the person to the seat should be such that while the hips and shoulders touch the back of the seat, the other portions of the back remain clear. The center of the back can not touch the back of the seat without relaxation of the muscles and resulting flatness of the chest, and perhaps of the stomach, provided, of course, the seat has a backward curva-



Taken from the plaster cast made ust after death.

Travel in Dancing. An average waltz takes a dancer over about three-quarters of a mile, a square dance makes him cover half a mile. A girl with a well-filled program travels thus in one evening: Twelve waltzes, estimate, two miles more; the inter-mission stroll, and the trips to the dressing-room to renovate her gown and complexion, half a mile; grand toes and a half miles.

does not look like a and decided cases of the greatest importance. He does not bear any very marked resem blance to a general, but he has com-manded a considerable force in battle, and while military critics might have complained that be none ever charge him with a lack of

WILDCAY SHITH. valor. Few people would discover in his face or manner my of those traits that distinguish a duelist, but he has demonstrated that he possesses them all in an eminent degree by ordering "pistols and coffee for two" more than once. Upon one occasion he had the audacity to invite General Houston, who was at that period president of the republic, to "come out and exchange shots" with him. He says that the old warrior "floored" him by coolly making a note on a slip of paper and putting it in his desk. In answer to the enraged challenger's inquiry, the General simply said: "Mr. Smith, you are the for-tieth; when I have killed these other thirty-nine damned scoundrels who have challenged me I will accommodate you. Be patient, sir."

Smith came to Texas in 1836, and served in the Texan army through all the long wars with Mexico. He was also a soldier in the great civil war, and when that ended he enlisted to fight Indians and remained on the border until there were no more Co-

manches to shoot.
On one occasion Smith was captured by a roving band of Comanches, many of whom were well known to him. They frankly told him that they intended to make him run the gantlet and burn him at the stake when they reached their village on Devil River. The captive had a flask of whisky, which the chief took away from him. After taking several drinks the old warrior asked Smith if he could play 'seven up." Smith proudly boasted that he could beat any man living playing that particular game. This answer appeared to put the Indian on his mettle, and he at once proposed that they should halt by the side of the warpath and play for the highest stakes that mortal men ever waged on a game of chance-life. Smith eagerly agreed



GAME FOR TWO LIVES.

to the proposal, and they sat down un der a tree and dealt the cards on a blanket. The other warriors dismount ed and anxiously watched the game The chief's name was Big Laugh, so called on account of a natural grin that marked his features. After a short time they stood 6 to 6, and it was Smith's deal. He ran the cards off and turned a jack from the bottom. Smith had won his liberty and Big Laugh told him that he might go; but the Texan had something else in view. He might have walked away, but he determined upon another act which marks him as a generous soul possessed of the highest courage. There was a young white girl tied on one of the ponies who was weeping in the most piteous agony. Smith coolly proposed to play another game, staking his life against the liberty of this young girl. Big Laugh was evidently pleased with the white man's courage, and after taking another drink he began to shuffle the cards. The girl was cut loose from the pony and made to stand on the blanket, while the thongs for binding Smith in case he lost were thrown at her feet. Again they played a close game, and at the end of a short time stood 6 to 6; but it was Big Laugh's deal. With what awful interest that poor girl must have watched the turnng of that trump. The Indian slowly dealt the cards, and, peeping at the trump, a hideous grin spread over his

"I was sure that all was lost, and was just in the act of springing at his throat," says Smith, "when he turned the queen of hearts for a trump. He could not give me, of course, and I held both the ace and deuce of bearts."

Big Laugh was by this time hilariously drunk and in a most excellent good humor. He not only kept his word and gave Smith and the young girl their liberty, but he furnished them two ponies and allowed Smith to take his gun. The liberated captives reached the settlements in safety.

First Bank Run in London. The first "run" upon the banking in-stitutions in London of which any record exists took place in 1607, in which several Lombard street bankers and goldsmiths who had loaned out the noney intrusted to them found themselves unable to meet demands for imnediate payment. Many creditors assembled and riots ensued. Four bankers were hanged at their own doors before order could be restored and the creditors persuaded that they were not being swindled.

Disproportion of Bexes. The disproportion of the sexes is still ery great in Australia. In Western Australia, e. g., there were only 54,000 romen in a population of 188,000.

At the average picule there is too



De Garry—Are you sure no one was looking when you kissed her? Merritt —Positive. She wasn't even looking berself. Town Topics.

"We've been playing achool, mam-ma." "Indeed! I hope you behaved nicely." "Oh, I didn't have to betwee. I was the teacher."-Truth.

Madge Why are you buying such ex-pensive stockings? You don't need them. Mayme—Oh, I'll put them away for a rainy day.-Town Topics.

His Honor-Young man, do you you know what an oath is? Boy-Ye-es, dr: I enddled for you last Sunday .-

"Doctor, my husband says black and red spots appear before his eyes every night. What do you advise?" "I advise that he stop playing poker."-Chicago News.

Husband-I am going to join another club to-night. Wife-I don't suppose I shall see you at all after this. Husband-Oh, yes! They have a ladies' day.-Puck

Tommy-It was a dreadful day the last time I went to grandma's. It blowed and it- Mother-It "blowed" is not proper. Say it "blew." Tommy-It blew and it snew awful.-Tit-Bits.

Kelly (growing pathetic)-Pity poor, unfortunate man, Kelliher, thot's got to go home to his wolfe! Kelliher-Brace up, Kelly! Brace up! Ye should be thankful ye are not the Sultan!-Puck.

Hogan-Schwarzmeister was tellin' ne that Uncle Sam could never lick the Fillypanoes. Grogan-An' did ye show him he was wrong? "Ol did. Ol think he will be out in about a fortnight."-Indianapolis Journal.

"Is the cashler in?" "No, he's not." "When will he be back?" "Can't say. He skipped for Canada about an hour "Just my luck! I'm his brother, and he took my hat by mistake this morning!"-Yonkers Statesman.

"What is that old proverb about the moss and the rolling stone?" queried the Chicago girl. "A revolving fragment of the paleozoic age collects no cryptogamous vegetation," replied her cousin from Boston.—Chicago News. "Seems odd, nowadays, that such

poets as Moore and all of them were always writing 'Lines to Fannie.'" Probably Pegasus is like other horses, and they gave the lines to Fannie so as to have their hands free."-Harlem

Nice Old Lady-Will you kindly tell me if the lady who writes the "Mother's Page" in your paper is in? I want to tell her how much I enjoyed reading her articles on "The Evening Hour in the Nursery." Office Boy-That's him over there wid de pink shirt, smokin' a cigaroot.-Tid-Bits.

A paper published in Paris recently contained the following unique advertisement: "A young man of agreeable presence, and desirous of getting married, would like to make the acquaintance of an aged and experienced gentieman who could dissuade him from taking the fatal step."—Exchange.

"Did you hear about Lucy Wester and Al Winslow failing out?" "No! When did that happen? Pshaw, it can't be true. I saw them together last night." "Yes, it's really so. They went rowing on the pond in the park day before yesterday and tried to change seats in the boat."-Chicago Times-Herald.

Tommy-Miss Upjohn, I want to know the names of the twelve disciples. His Sunday School Teacher-Certainly, Tommy. They were Peter, James, John, Andrew, Philip, Thomas, Judas andand-I can find the names of the others in a moment- Tommy-No fair lookin'. I knowed you couldn't do it!-New York Evening World.

Young lady-The musical conservatory is in this building, isn't it? Janitor -No. mum. The musical conservatory is 'bout two blocks down street. Young lady (dublously)-I-I was sure I heard pupils practicing vocal exercises. Are you sure the musical conservatory is not here? Janitor-Yes'm. Nothin' dentists' offices, mum.-New York

"Great Scott, man," thundered the householder to the ice man, as he looked at his bill for the month, "do you want to make an independent fortune in one season?" "Well," said the man, "I read in a scientific treatise that the sun was gradually losing its heat, and I can't run any chances of being without the means of a livelihood."-Kansas City Star.

"Won't you sit down in this chair, Willie?" said the kind lady who lived next door to the little fellow who had come to pay her a call. "If it's all the same to you, ma'am," said the little visitor, a shadow of pain creeping over his innocent face, "I'll prefer to sit in a chair with a soft cushion. I hid pa's collar button yesterday morning and

he found it out."-Boston Traveler. "It's a great scheme!" exclaimed Farmer Corntossel; "a great scheme. 'What's happenin'?" asked his wife, They're buildin' good roads all around Havana. They're goin' at it enthusias. tic an' industrious. An' I'm in great bopes that after they git throu with good roads in Caba-thayili we around by degrees to the similar nee of some of us folks in the United States."-Washington Star.

She People talk of Sunday being a day of rest, and yet look at the way the poor women bave to work to get their husbands to go to church. He—Yes, and yet look at the way the poor husbands have to work to get out of going.-Brooklyu Life.

Just before W. W Smith, of ence, Kan., goes to bed he can places his beard in a mailin bar. he has entered the bad, he pe bag under his pilling fills be nearly eight feet long.

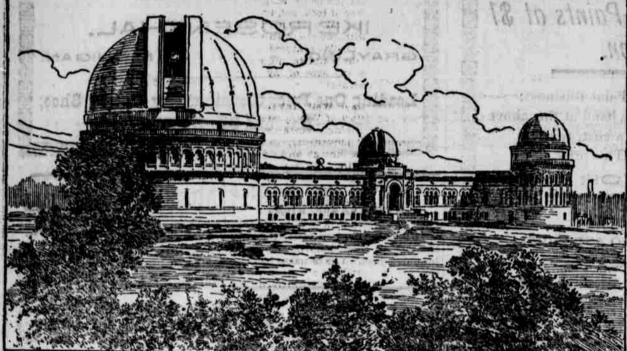
There is a great difference in women



WHAT MAY BE SEEN THROUGH HE YERKES TELESCOPE.

and never asleep.

What can the ordinary observer see



YERKES OBSERVATORY AT WILLIAMS BAY, WIS

know a telescope from a barrel? A reporter for the Chicago Inter of the University of Chicago at Will- the sun. Curious as it may seem, a these questions. A big telescope is al- more wonderful to the astronomer most human. It is furnished with a than to the man who looks millions of curious sixth sense, a marvelous sec- miles into space for the first time. To ond sight. Mysterious, uncanny, huge, it powerfully impresses one and grows details which escape the untrained eye. the stars are calculated by cobwebs more wonderful on closer acquaintance. Every line has a meaning, and in the nicely stretched and forming the real between two blocks.—Chiengo Inter The whole observatory is built about merest trifles he

its monster eye. For the eye alone are | million years.

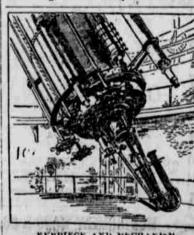
of swung around on its axis. The telescope itself is a big iron tube feet long, about forty-two inches in sixty-two feet long, painted black. In the end which looks out through the dome is the object glass or refracting eye, forty inches in diameter, or four inches wider than the lens of any other telescope of the kind in the world. The iron tube, with its lenses, finder, eye pieces and other appliances, weighs nearly twenty tons. And yet so nicely is it balanced that a strong pull with the hand will swing it a foot or more. The huge telescope is moved on its axis

by electricity.

Describing the apparatus, Dr. Hale finally fixed the big eye of the telescope on the planet Saturn. It was a fine, clear night, with little disturbance in the atmosphere, and Saturn appeared to twinkle about half way between the sky line and the zenith. The eye plece which was put on magnified nearly 500 diameters, one eighth the highest pow- diameter, and weighing six tons. No er used. This is how the planet Saturn figures, however, can properly express looked to the reporter gazing through the size, the delicacy, the almost huthe biggest telescope in the world: It man intelligence of the great machine, appeared a yellow, round disk about The object glass of this telescope is clearly globular. Around it twinkled a fine silk handkerchief rubbed across purple band a quarter of an inch wide. Its surface would destroy it. And yet, the planet, of the same bright yellow color, and quite distinct; next to this Paris by the firm of Mantols, celebrat was a second narrow violet band, and ed for the manufacture of optical aurrounding that a second broad yellow band like the first. Around the whole sparkled a brilliant violet circle. a solid, perfectly achromatic block of Saturn's moons appeared as three tiny glass more than thirty inches in diamround yellow marbles grouped to form eter. Then came the American order a pruning hook to the left of the plan- for two leuses thirty-six inches in di-et's disk, while a fourth one hung a lit- ameter. The Frenchmen could but side. No oscillation was apparent. Sat- to the outcome. Nineteen times the urn's rings and satellites apparently trial was a failure. For months the were of the same yellow color of the mold was allowed to cool impercepti-planet. Sometimes these rings can be bly each day until all the heat had From the outer rim of the planet prop- flaws too great to be remedied-minute the distance, through the telescope, other defects. The twentieth trial looked to be about two inches. It is, in fact, 172,000 aniles! Looking through which finally became the property of the huge refractor, the human eye is able to discern a space of 172,000 miles by this success, the firm of Mantois as two inches is the area of the heav-

the astronomer each object is full of

the motors, the flying pulleys, the mov- The history of the Yerkes telescope able dome, the rising floor, and all the itself is the history of the evolution of curious instruments varying from the an eye, of the most wonderful artifidelicately strung spider web of the cial seeing apparatus yet devised. This micrometer to an apparatus weighing great eye is 200 times as large as the fifty tons. Without the huge eye every- human eye. That is to say, its diamthing would be useless. This eye is eter is forty inches, while the diamethe lens of the refracting telescope in ter of the pupil of the human eye is the main tower at the western end of one-fifth inch. It is made of two septhe observatory. It is reached by a arate lenses, one of crown giass, two flight of marble steps from the main and one-half inches thick at the cencorridor. Entering the building in the ter, three-fourths of an inch thick at eventue, all is quiet and dimly lighted, the edge, and weighing 200 pounds; the main tower quite dark. About the other of flint glass, one and onemidway of the round dome is the ris- half inches thick at the center, two ing floor, over which the telescope inches thick at the edge, and weighing swings. It is a triumph of mechanical 300 pounds. One of these glasses is skill, the only satisfactory means de- convex and the other plano-concave. vised for reaching the eye piece of a These two lenses are mounted eight big telescope as it is tilted up and down and three-sixteenths inches apart in the end of a big steel tube sixty-two



EVEPTECE AND MECHANISM. size of the moon, not flat, but as delicate as a human eye. A super-Next to this was a solid ring encircling with proper care, it will never wear. The glass for each lens was cast in tle lower down to itself on the same try, although they were skeptical as discerned in their colors and form a gone out of it. Then came the test.

brilliant rainbow about the planet. Nineteen times the glass contained er to the outer edge of the outside ring. bubbles, unequal densities, various

What does the finest telescope in the | hooked yellow flame half obscured by | fied to advantage depends largely upon world look like to a man who doesn't what looked like gray vapors. There the perfection of the object glass. In was an apparent movement, the flame the Yerkes telescope a glass which darting high, sinking down, or again magnifies 3,700 times has been em-Ocean visited the Yerkes observatory bending over to lick the round disk of ployed successfully. Through this the University of Chicago at Will- the sun. Curious as it may seem, a the moon would appear as it would to lams Bay for the purpose of answering glimpse through this powerful glass is the naked eye at a distance of sixtyfour miles. The eye piece ordinarily used magnifies 460 diameters. Incredible as it seems, the delicate

measurements of the movements of measuring apparatus of the micrometer. They last for years and are even cleaned of dust with a delicate camel's-hair brush. Taking off the glass covering one evening, Prof. Burnham was examining the webs. He absentmindedly breathed into the aperture breaking one of the filaments, which It took considerable time to replace. At the Yerkes telescope a device has been perfected for lighting the thrends with electricity and making them a faint red color. A white light on them would be so brilliant as to injure the eye of the observer. In addition to its micrometer, the big telescope is equipped with all other accessories. such as spectroscopes, spectographs, spectro heliographs, photo heliographs,

While interest centers around the main dome and its sleepless eye, the Yerkes Observatory would be a big institution if it had only its minor glasses to depend upon. One of these is a twelve-inch refractor mounted in the north dome. A twenty-four inch reflector will shortly be mounted in the south dome. A sixty-inch reflecting telescope is also being built now in the instrument shop of the observatory, and will be mounted in another building at some future time. As it stands equipped the Yerkes Observatory cost \$500,000. It is the most complete in the world, with a refracting telescope forty inches in diameter. Next in order is the Lick Observatory on Mount Hamilton, with its thirty-six inch refractor, and third in order is the Imperial Observatory at Pulkowa, Rusia, with a leus thirty inches in di-

"ome of the Telescope.

The building is in the form of a Latin cross, the longer axis of which lies due east and west. A great ninety-foot dome completes the western end and twenty-six foot and thirtyfoot domes terminate the north and south transepts. The body of the building is divided into laboratories, libraries, offices, computing rooms and photographic dark rooms. The ground floor is equipped as an instrument shop, making this the only observatory in the world which manufactures its apparatus under the direct super vision of those who use them. This gives unexampled facilities for the application of new methods of reearch, and already more than a dozen intricate machines have been constructed and used successfully. The observatory is built of yellow brick, ornamented with fluted columns carved at the bases with gargoyles and other symbolic devices. The corridors and stairs are finished in white marble deilentely velned in green and the wood is of massive oak. The observatory has a little life of

Madrid abounds in slums, which are en greater eyesores than those of Whitechapel. There are labyrinths of narrow old streets, bordered by the most unjuviting hovels; and from the squalor of these abodes spring the nents of the ferocious mule

nine miles; four other dances at half s nile apiece, which is hardly a fairly big